Remarks

The abstract has been amended in accordance with the Examiner's suggestion.

The Examiner has examined claims 1-16 in the present application. The Application was filed with Claims1-19 and no restriction requirement or cancellation of claims has been made. The examination in the outstanding official action is thus incomplete. The Examiner is thus requested to examine originally filed claims 17-19 and submit a new non-final official action.

Indication that Claims 3-6, 9, 10, 13, and 14 contain allowable subject matter is noted with appreciation.

The Examiner has rejected Claims 1, 2, 7, 8, 11, and 12 as being anticipated by U.S. Patent 2,662,478 to Surre. This rejection is improper and should be withdrawn.

Original claims 1, 2, 7, 8, 11 and 12 (and all other original claims) all contain the limitation that "said diaphragm in one section of the clamping region (E) comprising a sensor region (S) where the diaphragm layers (1, 2) are formed so that an increase in pressure between the diaphragm layers (1, 2), with an increase in distance between the diaphragm layers in sensor region (S)." There is absolutely no such structure or suggestion of such a structure in the Surre reference. The Surre reference actually teaches away from such a structure by providing "radial grooves e_3" that permit passage of gas through pipes and/or passages to the exterior of the diaphragms. The provision of such grooves for passage of gas will reduce pressure, not increase pressure, between diaphragm layers due to breach of diaphragm integrity. In addition pipes h_1 and g_1 of Surre connected to some kind of detector are subject to damage. **There is absolutely no teaching or suggestion by Surre of any diaphragm movement in a sensing region (S)**

within a clamping region (E). For this reason alone the presently claimed invention is not anticipated by and unobvious in view of Surre, is improper and should be withdrawn.

Additionally, original Claims 1, 2, 7, 8, 11, and 12 (and all other original claims) all require "said diaphragm layers (1, 2) being connected to each other so that they are sealed against penetration of liquid and/or gas between the diaphragm layers". Gas or liquid may thus not pass "between" the layers to the exterior. By contrast, Surre teaches away from this required limitation of the present invention and "requires" that gas be permitted to pass from behind the diaphragm through radial grooves e_3 **between** diaphragm layers **to the exterior.** This is exceedingly troublesome when the gas is corrosive or toxic in nature as such materials may destroy sensor equipment or if allowed to vent can create a serious health hazard.. **The present invention is thus precisely contrary to, not anticipated by, and unobvious in view of the teachings and suggestions of Surre.** The rejection is clearly improper and must clearly be withdrawn.

Claims 15 and 16 have been rejected by the Examiner under 35 U.S.C. 103 as being obvious over Surre in view of U.S. Patent 5,074,757 to Horn. This rejection is clearly improper and should be withdrawn.

Claims 15 and 16 are ultimately dependent upon Claim 1 and contain all of the limitations of Claim 1. As previously pointed out, Surre does not disclose or suggest critical limitations of Claim 1 and actually teaches away from those limitations. In particular, **1) there is absolutely no teaching or suggestion by Surre of any diaphragm movement in a sensing region (S) within a clamping region (E) as required by the present invention and 2) Surre teaches away from the required limitation of the present invention that gas or liquid not**

pass between diaphragm layers and instead Surre "requires" the opposite, i.e. that gas be permitted to pass from behind the diaphragm between the layers through radial grooves e_3 between diaphragm layers to the exterior.

Horn does nothing to cure these critical defects of Surre. Horn, similar to Surre, requires a "leakage slot "22" that carries fluid from behind the diaphragm to the exterior from between diaphragm layers, exactly contrary to the requirements of the present invention and also, as in Surre, there is absolutely no teaching or suggestion by Horn of any diaphragm movement in a sensing region (S) within a clamping region (E) as required by the present invention. As in Surre, all sensing is exterior to the diaphragm layers and no diaphragm movement is detected to determine breach of a diaphragm layer as required by the presently pending claims. There is certainly no detection of diaphragm movement in a sensing region within a clamping region. **It is thus clear that Horn discloses absolutely nothing to cure the critical defects of Surre. The rejection is thus clearly improper and needs to be withdrawn.**

The differences between the cited art and the claimed invention, as discussed above are not trivial and are discussed with more particularity below.

Surre discloses a diaphagm comprising at least three diaphagm elements (layers) including a central (e) and two outside elements (e_1 and e_2). The diaphragm is mounted across a chamber (c) and separates the chamber into two upper and lower parts. Towards their periphery, the diaphragm elements are clamped between plates (a) and (b) and extend beyond their clamping area reaching into an annular recess (f) separated by the diaphragm into two upper and lower parts. One of these parts is connected with a duct (h) which is in turn connected to a detection device (distally removed from the diaphragm). Another of these parts is connected

with a duct (h) that is in turn connected to a detector device (also distally removed from the diaphragm).

If one of the diaphragm elements (e_1) or (e_2) become punctured or cracked, part of the fluid in upper or lower chamber (c) will flow "between" the layers of the diaphragm elements and move outwardly, pass the clamping region and exit the space between the diaphragm elements and enter into the upper or lower of recess (f) and from there via ducts (g or h) to one of the detectors thereby indicating a breaking of a layer of the diaphragm (col. 3, lines 45-65).

In contrast to the safety diaphragm of the presently claimed invention, the diaphragm elements of Surre are clearly not completely sealed against penetration of fluid between layers. This would be opposed to the specific requirement of Surre that fluid be permitted to pass between the layers in case one of the diaphragm elements fails. Without leakage of fluid from between the layers into recess (f) no fluid could reach the detectors and indicate diaphragm failure.

The present invention operates by an entirely different principle than Surre and requires entirely different structure for that purpose. In accordance with the present invention, and completely opposite to Surre, leakage of fluid between layers of the diaphragm is unwanted and avoided by connecting the diaphragm layers to each other so that they are sealed against penetration between them. A signal indicating failure is obtained by utilizing a sensor region within a clamping region which indicates diaphragm failure due to a pressure increase between diaphragm layers resulting in an easily seen increased distance between layers in the sensor region. For that purpose, diaphragm layers in the sensor region are designed (and claimed) so that deformation of at least one of the layers in the sensor region is easier than than in other

sections of the diaphragm. The advantage of the safety diaphragm of the invention is that no fluid can penetrate from between the diaphragm layers and reach into the pump housing or adversely impact sensors. A pump utilizing the diaphragm of the invention may thus continue to operate under emergency conditions until the diaphragm is changed without leakage.

The pump housing, sensors, and the environment is thus protected from contamination with pumped medium which may be toxic or corrosive.

The safety diaphragm of the present invention is provided with at least two features not present in or suggested by Surre. In particular,

a) diaphragm layers are connected to each other so that they are sealed against penetration of fluids between layers; and

b) a sensor region is provided between diaphragm layers so that in an increase in pressure, resulting from failure of a diaphragm layer, will provide a visible increase in distance between the layers in the sensor region that is made even more significant by having layers that more easily deform in the sensor region.

It is thus clear that Surre teaches away from the present invention since it uses leakage as an indicator of diaphragm element failure; whereas, in the present invention, leakage is entirely avoided.

The disclosure of the Horn reference in all essential respects is the same as Surre and corrects none of its defects. Again Horn uses leakage between layers, utilizing a diaphragm opening and a connecting duct as a means to indicate diaphragm failure, while in the present invention, leakage is entirely avoided. Horn does not provide any sensor region between diaphragm layers where the layers deform more easily than at other locations on the diaphragm

but instead provides a region where a duct is inserted through an opening in a diaphragm layer into a space between the layers to measure pressure of fluid leaking from between the layers.

It is thus again asserted that the 35 U.S.C. 102 and 103 rejections are clearly improper and should be withdrawn.

Claim 1 has been amended to simply for purposes of clarifying limitations specifically or implicitly already present in the original claims.

In view of the foregoing remarks, it is thus clear that all claims are in condition for allowance, which action is courteously requested.

Respectfully submitted,

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